REMARKS

This Amendment is filed for the purpose of responding to the Office Action of October 5, 2000 in which the Examiner objected to certain claims for technical reasons. The applicants have amended the claims to over come the various objections. In particular claim dependencies have been corrected in order to reestablish antecedent basis for certain features noted by the Examiner. Certain claims have been combined with the same effect. Accordingly, it is respectfully requested that the objections be withdrawn.

Claims 34, 35, 37,40, 41 and 56 have been rejected as allegedly anticipated by Tekeuchi. Applicants have amended independent claims 34 and 37 have been amended to incorporate a particular winding into the process which is not employed in the references. Accordingly, it is believed that the rejection has been obviated.

The Examiner has rejected apparatus claims over Huang et al. in view of Nikitin et al. and Elton et al. (Elton 165) and various other references. The Examiner has rejected the method claims over Takeuchi in view of Huang et al. or Elton 165.

The Examiner has asserted that Huang et al discloses a stator for a rotating electric machine having certain features and a winding wherein the electric field is confined for at least one turn. The Examiner asserts that Nikitin et al. discloses a high voltage stator, and Elton 165 discloses cable with a magnetically permeable, electric field confining covering. According to the Examiner it would have been obvious to modify the machine of Huang and provide a high voltage stator with windings

comprising a high voltage cable including a current carrying conductor as in Nikitin and a cable as in Elton 165.

Applicants wish to review hereinafter the background of selected references in order to clarify the basis of their arguments that the references cited by the Examiner are inappropriate and inapplicable to the claims.

INTERPRETATION OF ELTON ET AL. (U.S. PATENT 5,036,165)

Applicants understand the Office Action to mean that the Examiner is reading Elton ('165) as disclosing a particular type of electrical cable used as a winding in a dynamoelectric machine. For the reasons to appear hereinafter, Elton ('165) does not disclose that the electrical cable shown in Figure 1 thereof may be used for windings in a dynamoelectric machine. Rather, the conductor shown in Figure 1 of Elton ('165) is used only for an electrical transmission and distribution cable.

Elton ('165) is a divisional of what is now issued U.S. Patent No. 4,853,565 (Elton ('565)). As stated in column 1, lines 5-9 of Elton ('165), the '565 patent is incorporated by reference in its entirety into Elton ('165). Therefore, although not reproduced expressly in Elton ('165), the Elton ('165) patent must be construed as if all of the text and drawings in Elton ('565) were expressly included in and reproduced in Elton ('165).

Applicants contend Elton ('565) teach mutually exclusive embodiments (i.e., a "cable," a "bar, " or "windings" in a generator). When the appropriate teaching from Elton ('565) is considered, one of ordinary skill would not see an incentive to combine it

with Huang. Elton ('565) discloses, generally, the semiconducting layer for insulated electrical conductors in three different embodiments, none of which are a cable 100 winding as the second embodiment shows in Fig 7. The first embodiment (Figs. 1-6) deals with windings in a dynamoelectric machine. In this embodiment, the conductors are referred to exclusively as "windings" or " bars." The second embodiment (Fig. 7) relates strictly to an electrical cable 100 used for the transmission of high voltage. Within this embodiment, the conductor is referred to as a "cable" and not as a "bar" or "winding." The third embodiment (Fig. 8) relates to the use of a semiconductor layer disposed on an electrical housing surrounding digital electrical equipment. The conductor in this particular embodiment is referred to as a "housing" as opposed to a "cable", a "bar," or a "winding." In reviewing the Elton et al. references, the terms used were carefully chosen and applied uniformly throughout the references.

With the foregoing as background, it follows that the mention in Elton ('165) to a "dynamoelectric machine" was in all likelihood inadvertent (*i.e.*, that term, or sentences containing that term, were not deleted when the divisional was filed on the "cable" embodiment). In any event, however, why such mention to a "dynamoelectric machine" remains in the Elton ('165) patent is fairly immaterial, since, as described above, the entire contents of the Elton ('565) patent are incorporated by reference into the Elton ('165) patent. When all of the disclosure is taken together, as it must, it is clear that the conductor designated 100 in Elton ('165) relates only to an electrical cable for transmission and distribution of electrical power, and not to a winding for a dynamoelectric machine. Any other interpretation, Applicants submit, would be contrary

to the plain meaning given to the words as defined in the Elton ('165) and Elton ('565) specifications.

NO MOTIVATION TO COMBINE

The Examiner has rejected the above claims as being obvious over Huang in view of Nikitin and Elton ('165). Applicants submit that this is an improper combination of references in light of the standard regarding such a combination set forth in In Re Geiger, 815 F.2d at 688, 2 USPQ2d at 1278 (Fed. Cir. 1987). This standard is as follows: "[o]bviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, *absent some teaching, suggestion or incentive* supporting the combination." Id. (emphasis added).

Huang is an electric machine that possesses windings formed of cable. However, the machine in Huang is a high current/low voltage machine, and Applicants respectfully assert that Huang would not work in a high voltage application that the present invention operates in.

Nikitin, et al. is an arrangement employing a length of circular conductor in a machine having an oil filled stator region. It is submitted that Nikitin et al. does not disclose a high voltage stator comprising a high voltage cable. While Nikitin et al. seeks to operate at higher voltage levels, Nikitin et al. does not suggest that a high voltage cable would be useful in a machine. . Nikitin also does not operate without the oil. As noted above Elton 165 likewise does not suggest that the transmission and distribution cable is applicable to a machine as well.

In conventional machines operating at higher voltages, normally between 10 and 20 kV, sometimes up to 30 kV, the coil end is normally provided with an electric-field control in the form of so-called corona protection varnish intended to convert a radial electric field into an axial field, which means that the insulation on the coil ends occurs at a high potential relative to ground. The electric-field control evens out the dielectric stress of the insulating material in the end winding region, but electric field concentrations are still a severe problem in electrical machines operating at these higher voltages. Huang simply shows a method for making a stator and does not show electric-field control. Conventional machines insulate conductors in electrical machines in a variety of ways (such as using so-called mica-tape) to provide resistance to partial discharge. If the ground insulation material used in conventional machines were subjected to partial discharge, it would eventually lead to deterioration of the insulation material. Also, if conventional machines such as described in Huang were operated at higher voltages, the uncontrolled electric field in the end winding region (not shown) would also result in high electric field concentrations causing a high dielectric stress of the insulation material, leading to deterioration of the insulation material.

The "invention" in Elton ('165) is the pyrolyzed glass fiber layer. Elton ('565) describes a process of immersing the winding portions in a bath of resin and vacuum pressure impregnating (VPI) the resin in the winding. The VPI process results in a cured resin having no voids or gaps between layers. The cable shown in Fig. 1 of Elton (' 165) includes two pyrolyzed glass fiber layers, layers 104 and 110.

> The internal grading layer [104] is a semi-conducting pyrolyzed glass fiber layer as disclosed herein. . . . An insulation 106

> surrounds internal grading layer 104. On the external surface of insulation 106, a semi-conducting pyrolyzed glass fiber layer 110 equalizes the electrical potential thereon. (Elton ('165): column 2, lines 34-41).

As further evidence that cable 100 shown in Fig. 1 of Elton ('165) would not be suitable as a winding in an electric machine, having two pyrolyzed glass fiber layers would cause the cable to be prohibitively stiff for winding through the stator slots. It may be possible to VPI the entire stator in a large resin bath after it had been wound with a flexible cable. However, such a process would not be feasible to produce both the internal grading layer 104 and the external layer 110 since an insulation layer 106 surrounds the internal grading layer 104 and both layers 110 and 104 would need to be exposed to the resin and cured. Accordingly, while Elton et al. ('565) describes how to provide a pyrolyzed glass fiber layer for a bar-type winding, Neither Elton ('565) nor Elton ('165) teach or suggest that cable 100 of Fig. 1 in Elton ('165) or Fig. 7 in Elton ('565) could be used for such a purpose, especially since cable 100 in the Elton et al. references would be stiff, not flexible as the Office contends.

Elton ('565) recognizes that in the end-winding region just outside of the stator of an electric machine, there will be problems caused by strong electric fields. As a solution, Elton ('565) describes using a known grading near the stator to allow some of the accumulated charge to bleed off to the stator, thus reducing the risk of arcing, but Elton ('565) offers no other solutions to the problems in the end-winding region. The strong electric fields will be present throughout the end-winding region, not just near the stator. The grading used in Elton ('565) will help to lessen the effects of the strong electric fields near the stator, but will not address the problems in the end-winding

region away from the stator. Elton ('565) uses rigid bar-type windings which are able to withstand mechanical stresses caused by induced fields between the windings in the end-winding region, where electromagnetic fields are not contained in the winding. The mechanical rigidity of the bar-type windings used in conventional machines suppress the amount of vibration in the end-winding region that would otherwise be present. The fact that a grading system is used to lessen the end-winding region problems near the stator in Elton (' 565) is further evidence that neither Elton ('565) nor Elton ('165) suggest using cable 100 as a winding of a machine, since such a cable would not have a grading.

The present invention specifically embodies a flexible cable winding and cable structure. The cable allows for a continuous full turn, making a joint in the end winding unnecessary. This, along with the fact that the outer surface of the cable is grounded, allows for the confinement of the electric field resulting in the diminished risks of losses and damage in the end winding region. Elton ('165) may teach a cable, however, in no way does it teach the cable as a winding.

Moreover, there is no likelihood of success. The MPEP § 706.02(j) sets forth the burden that the Office must carry in order to reject claims based on obviousness. One criteria that must be met is that there must be a reasonable expectation of success. This criteria cannot be met when the aforementioned references are combined.

Assuming for the sake of argument that the cable 100 recited in Elton ('165) is combined with the cable windings of Huang, there is no likelihood of success because of the inflexibility and brittleness of cable 100. The pyrolyzed glass layer of cable 100

would crack when attempted to be threaded through a stator core slot and then bent in the end region so as to thread the winding into the next stator slot.. These cracks would, in effect, promote corona discharge as opposed to prohibit it, as is contended by the Office, resulting in losses attributed to the lack of confinement of the electric field, rendering the system inefficient. It is, therefore, not surprising that neither Elton (' 565) nor Elton ('165) make any disclosure of the use of cable 100 as a "winding" in a dynamoelectric machine.

Accordingly, for at least the reasons set forth above, Applicants respectfully request that the rejection of the apparatus claims be reconsidered and withdrawn. Applicants further submit, as an alternate ground of allowability, that apparatus claims depend from base claims which are believed to be allowable, and therefore, include every limitation of the respective base claim. Inasmuch as base claims are believed to be allowable, Applicants respectfully submit that the respective dependent claims of each base claim are also allowable for at least the same reasons as the base claim is believed to be allowable. Accordingly, Applicants respectfully request that the rejection of the dependent claims be reconsidered and withdrawn in view of the believed allowability of base claims.

Method Claims stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Takeuchi et al. (U.S. Patent No. 5,583,387) in view of Elton et al. (U.S. Patent No. 5,036,165; "Elton ('165)"). The Examiner contends that it would have been obvious to have used the teaching of Takeuchi et al. to make a stator and provide the winding using the cable of Elton 165, since such a modification would reduce or avoid corona

discharge. Applicants respectfully traverse this rejection for at least the following reasons.

There is no motivation, incentive or suggestion to combine Takeuchi et al. and Elton et al. 165, as is set forth above. Because the base combination is improper, any broader combination is likewise improper, therefore, the broader combination of the references is likewise improper.

Furthermore, Applicants respectfully assert that Takeuchi et al. is simply a conventional device, which does not employ a high voltage cable as a winding. Takeuchi et al. may disclose a particular stator configuration. However, the purpose of this feature in Takeuchi et al. is to develop a high density winding arrangement for producing a space saving at the end of the device (col. 2 lines20-24). Although it is believed that the present invention results in an efficient and improved design, it does not result in a high density end winding region as set forth in the reference. Takeuchi et al. has nothing to do with a cable winding where power is generated in an electromagnetic device.

In the present invention, the core construction reduces eddy current losses by restricting the paths for such currents in the stator. Eddy currents are induced in the core as a result of the exposure of the core to high magnetic fields in the rotating electric machine. These currents are problematic in these applications because they create electrical losses which are manifested as thermal energy (heat), which in turn causes a number of reliability problems in rotating machines. The device described in the Takeuchi et al. reference is concerned with this problem.

In view of the foregoing, Applicants contend that one of ordinary skill in the art to which the invention pertains would not look to Takeuchi et al. for any relevant teaching. The references alone or in combination do not disclose a cable as a winding, and the cable therein is not employed in high voltage applications. The method claims show a method for producing a stator formed of laminated sections which are arranged in planks and which have features for receiving a high voltage winding in the form of a field confining structure. Accordingly, for at least the reasons set forth above, Applicants respectfully request that the rejection of the above claims be reconsidered and withdrawn. As an additional ground of allowability, Applicants respectfully submit that dependent claims depend from base claims which are believed to be allowable, and therefore, include every limitation thereof. Accordingly, inasmuch as base claims are believed to be allowable, Applicants respectfully submit that the corresponding dependent claims are likewise allowable.

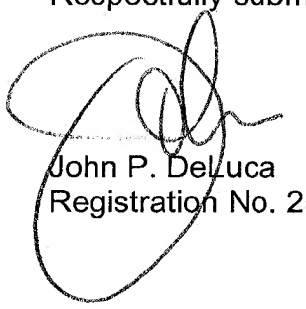
A number of critical ideas had to be combined in order to make a workable and practical system which has now been successfully commercialized. It was only when the critical characteristics and functions were identified that it became possible to proceed to assemble the necessary components and material to build a workable and practical system.

It should be noted that the challenges facing the inventors when trying to develop a high-voltage power generator were in large part related to areas that would be of no concern to a transmission and distribution cable designer. Developing an insulation system that could be used in a continuously operating machine, with many windings to

generate the desired voltages situated adjacent to one another causing heat problems, preventing eddy currents in the stator core, dealing with the vibrations in the windings, among others are all problems that would not face a cable engineer. Accordingly, it is hoped that this discussion makes it clear that it is not reasonable to presume that a generator engineer, seeking to solve problems unique to the operational environment of a high voltage rotating electric machine would look to transmission and distribution cable technology for solutions.

In view of the foregoing, it is respectfully requested that the Examiner reconsider his rejection of the claims, the allowance of which is earnestly solicited.

Respectfully submitted,



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